1 V SGE PROPERTIES

Constellation = Sagitta, The Arrow (best visible on summer evenings)
Coordinates = 20:20:14.69, +21:06:10.4, right ascension and declination, J2000
$D = 7760^{+750}_{-460}$ light-years, distance
$\langle V_{2019} \rangle$ = 11.0 mag, average visual brightness in the year 2019
$\langle B - V \rangle$ = 0.05 mag, average color
$E(B - V)$ = 0.20 $\pm$ 0.05 mag, excess $B - V$ color
M_V = -2.2 mag, average absolute magnitude
P = 0.514212053 days = 12.34 hours, orbital period
$\dot{P}$ = -2.44 $\times$ 10^{-10} days/cycle, rate of change of the orbital period
$|\ddot{P}| < 5 \times 10^{-15}$ days/cycle^2, acceleration of orbital period
M_{WD} = 0.85 $\pm$ 0.05 $M_\odot$, mass of the white dwarf
M_{comp}

3.2 The Merger Will Be In the year 2083 ± 16

The future of V Sge is straight forward to predict with good accuracy by the simple use of standard equations that model all the various physical mechanisms involved. The idea is to start with the well-known current system properties, use these properties to calculate how each of the properties will change in the next time interval, add these changes to get the system properties for a year or a day from now, and keep repeating this for time intervals marching o into the future. Initially, it may be adequate to have one-year intervals, but as the end approaches, shorter and shorter intervals are needed. The changes in angular momentum, semi-major axis, and Roche lobe size are governed by the mass transfer rates, and the changes in the mass transfer rates are governed by the rate of decrease for the Roche lobe radius. So, by propagating the system into the future, year-by-year and day-by-day, the future properties of V Sge can be predicted. This has been done by setting up a

In all, the detailed physics model for V Sge yields a merge year of 2083, with an uncertainty of ±16 years.